

Letter to the Editors

Response to: Assessing the harms of polypharmacy requires careful interpretation and consistent definitions

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Kouladjian and colleagues [1] call for caution around the conclusion of our recent work in *BJCP* that polypharmacy is not always hazardous [2]. They reference a number of papers reporting polypharmacy to be associated with poor outcomes in older adults [3–6]. They also question the methodology we employed to define polypharmacy and suggest that it would be of value to use a single cut-off for a specific age group.

We do not dispute that polypharmacy is undoubtedly associated with adverse outcomes in many situations, but simply point out that our work demonstrates that it is not a ubiquitous finding. In particular, whilst comorbidity or degree of ill health is often considered a confounder, we note that none of the previous work in older patients alluded to by Kouladjian *et al.* allows the effect of polypharmacy to be modified by degree of ill health [3–6] as we did via an interaction term. The more simplistic approach taken by such work thus only serves to perpetuate the assumption that polypharmacy is always undesirable. Importantly, on repeating our analysis restricted to the over 65-year-old population, we find very similar results to those presented in our original paper (see Figure 1).

In terms of definitions of polypharmacy, use of a single cut-off may at first sight appear simple and useful. However, as the correspondents themselves have previously observed, such cut-offs vary depending on the outcome of interest and more sophisticated alternatives to simple numeric thresholds may be of greater value [4]. We are not advocating our use of a five point categorical variable as the definitive approach to quantifying polypharmacy and agree that a consistent approach would be valuable, preferably accounting for appropriateness of treatment [7]. Nonetheless, our approach does suggest

a continuum of effect with varying medication count which would not be observed when considering a single cut-off, and thus more clearly demonstrates the nature of the association with multimorbidity and hospital admission.

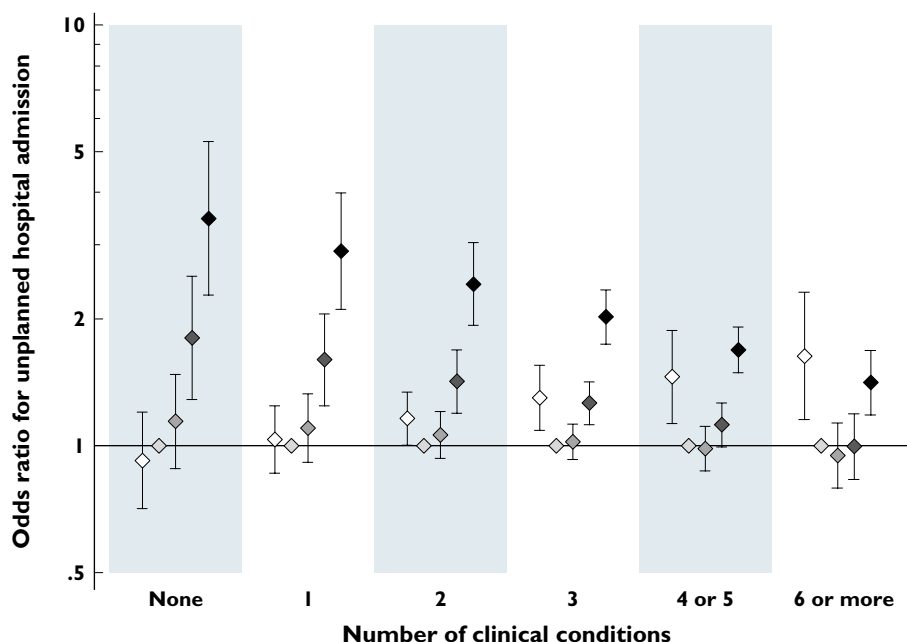
In summary, our key message remains that polypharmacy is not always harmful. Further work is essential to develop consistent definitions of polypharmacy, to establish what constitutes problematic as opposed to appropriate polypharmacy, and to ascertain how the adverse consequences of polypharmacy vary within the clinical context.

Competing Interest

All authors have completed the Unified Competing Interest form at http://www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare no support from any organization for the submitted work, no financial relationships with any organizations that might have an interest in the submitted work in the previous 3 years and no other relationships or activities that could appear to have influenced the submitted work.

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**Figure 1**

Adjusted odds ratios showing the association between admission and number of regular medications (relative to no regular medications), for different degrees of multimorbidity in over 65-year-olds only. For each number of clinical conditions, the clusters represent different numbers of medications, from none (white), through 1 to 3, 4 to 6, 7 to 9 and 10 or more medications (black). Error bars are 95% confidence intervals. The model is based on data from 38 785 patients aged over 65 years from our original population [2]. Number of medications: ◇, none; ◇, 1 to 3 (reference); ◆, 4 to 6; ◆, 7 to 9 ◆, 10 or more

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